Background Report #4

BACKGROUND REPORT
ON
AGRICULTURE

A Report to the Delta Protection Commission

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INTRODUCTION

The Delta Protection Commission is charged with preparation of a land use and resource management plan for the primary management area of the Delta, as defined in the Delta Protection Act. The Plan is to be adopted by the Commission and forwarded to the five Delta counties for adoption and implementation through the existing regulatory process.

The Counties regulate land use through the General Plans and Zoning Ordinances, and through the day-to-day review of proposed projects. This process is largely reactive; a project is proposed, permits applied for, and then County review begins. Change of ownership does not usually require any County review. Generally, State and federal projects are exempt from the local permit process; state and federal projects are reviewed through the environmental review process.

There are, however, many actions that local government can take to recognize agriculture as a key land use and to support its general well-being. For example, local governments can adopt policies which clearly support agriculture, can ban taxes which would adversely affect agriculture, and support tax programs that assist agriculture. Counties can clarify and simplify permitting processes for approval of common agricultural structures and activities.

The American Farmland Trust (AFT) has documented pressures on American agricultural lands, under pressure from rapid population growth and urban sprawl. Recent reports estimate permanent farmland conversion at two million acres a year. AFT is concerned that federal, state, and local officials are not adequately protecting agricultural lands from roads, airports, and suburban grow. As Mike Henry, Executive Director of the San Joaquin County Farm Bureau Federation, said recently, “They’re not making any more farmland. You get one shot at it, and then it’s gone” (River Herald, 11/24/93).

This report reviews the history of agriculture in the Delta, describes recent changes in land use in the Delta, describes current Delta agricultural crops, addresses trends in agriculture, identifies agricultural issues, notes current local planning related to agriculture, describes planning “tools” available to protect agricultural land, and discusses co-management of agricultural lands for wildlife habitat. An appendix lists non-profit groups working on agricultural issues.

Due to the very limited budget and very short timeline allotted the Delta Protection Commission to complete the task of preparing the Plan, this report is based on existing references, updated where feasible through personal contacts with agency staff. Maps are generously provided by the Department of Water Resources; reprinted from the 1993 Delta Atlas.

CHAPTER I: HISTORY OF DELTA AGRICULTURE

1. Beginning Stages of Delta Agriculture.

a. The Swamp and Overflow Act. As the Gold Rush began to wane, farmers were lured to the Delta area by the fine silt and deep peat soils laid down by centuries of river floods and marsh detritus. The land demonstrated its extraordinary fertility and farmers were able to raise enough food for their subsistence. The only problem with the Delta area was that it was primarily a wetland.

In 1850, Congress passed the Swamp and Overflow Act which gave states all of the unsold federal land within their borders that was swamp and overflowed. This Act, however, was subject to the condition that the states use the finds from the sale of these lands to ensure that the lands be drained, reclaimed, and put to productive agriculture. At the time, more than two million acres in California were designated as swamp and overflowed lands, about one-half of those lands, approximately 555,000 acres, were in the Delta (San Francisco Estuary Project, State of the Estuary, 1992). Before Congress passed the Swamp and Overflow Act in 1850, no attempt was made to grow crops in the Delta area. The Delta was a vast tule marsh dissected with waterways and rich in wildlife. The Federal Government owned all the land and only Native Americans, transient fisherman, trappers, hunters and a few unsuccessful gold miners visited the area (Soil Survey of the Sacramento-San Joaquin Delta Area, California, United States Department of Agriculture-University of California Agricultural Experiment Station, 1941).

b. Early Reclamation and Levee Building. California passed the Reclamation District Act in 1855 providing for the sale of swamp and overflow lands. The asking price was $1 per acre with payments over five years and a 320-acre limit (Department of Water Resources, Sacramento-San Joaquin Delta Atlas, 1993). In 1859 the initial individual purchase limit was raised to 659 acres and then lifted entirely as the State gave control of the Delta to the respective counties. By 1871 most of the lands had passed into private ownership (Hal Schell, Dawdling on the Delta).

The first levee was allegedly built by Rueben Kercheval in 1849 on Grand Island. According to a Department of Water Resources study, Sherman Island was the site of the first coordinated levee system in the Delta. The San Francisco Estuary Project reports that draining and reclamation first began on Merritt Island in 1853. During this early period of reclamation, many reclamation districts were organized with varying degrees of success.

The difficult task of reclamation would not have been as successful if it were not for the Chinese laborers that migrated to the Delta after finishing building the transcontinental railroad in 1869. They were paid 13 cents for every yard of dirt moved to the levees. The Chinese worked laboriously with simple hand tools such as wheelbarrows, and ere responsible for the first levees along the various islands (Hal Schell, Dawdling on the Delta, 1979 .

c. The Clamshell Dredge. In the late 1870's, the clamshell dredge was invented and soon replaced human labor in building levees. The dredge could move the Delta mud for

only five cents per yard and at a much quicker pace (Hal Schell, Dawdling on the Delta, 1979). The clamshell dredge revolutionized levee building in the Delta. Previously, levees had been comparatively small and built largely of surface materials dug from the interior of the islands. Only landowners who could afford the cost of the Chinese laborers were able to build high levees in order to prevent damage from flooding. The boom of the clamshell dredger, however, allowed deep cuts for the building of higher, stronger levees. The new methods of construction not only advanced reclamation into the very heart of the Delta area but also led to reorganization and reconstruction of older levees (Soil Survey of the Sacramento-San Joaquin Delta area, California, United States Department of Agriculture-University of California Agricultural Experiment Station, 1941). By 1880 most of the Delta was reclaimed using dredges. By 1930, all but minor areas of swampland had been leveed and were being farmed (Department of Water Resources, Sacramento-San Joaquin Delta Atlas, 1993).

d. Drainage and Irrigation. The advance into the heart of the Delta area created far more complex problems than those experienced in the earlier years of levee building and flooding. Not only was it necessary to construct higher and sturdier levees in order to avoid flooding, but elaborate drainage systems were essential to maintain the water at optimum levels for plant growth. Originally, pumps were installed along the levees to remove the floodwaters impounded after a break in the levee so that the land could be returned to production as soon as possible after a break was repaired. Later, pumps were also used to remove excess water off the islands (Soil Survey of the Sacramento-San Joaquin Delta Area, California, United States Department of Agriculture-University of California Agricultural Experiment Station, 1941).

Along with the development of drainage facilities came a recognition of the need for irrigation. By 1902 congress had passed the Reclamation Act for the development of irrigated lands in the Western United States (Department of Water Resources Sacramento-San Joaquin Delta Atlas). Irrigation water was generally carried in ditches about 10 feet wide (Soil Survey of the Sacramento-San Joaquin Delta Area, California, United States Department of Agriculture-University of California agricultural Experiment Station, 1941). Many farmer hired Portuguese laborers to maintain the ditches; using large knives, they worked twelve hours per day cleaning the ditches and were paid by every foot they cleared.

2. Early Delta Landowners.

As the reclamation period began in the Delta, settlements located on Grand Island along Steamboat Slough, and in Freeport. The Barber family settled at the northernmost tip of Grand island and across the river on the site of Courtland . Another early settlement was found at Russian Embarcadero, what is now called Freeport. The settlement was first called Russian Embarcadero because Slavs loaded wheat at the site. These early settlers engaged in vegetable gardening, salmon fishing, woodcutting, and making aguardiente brandy from wild grapes growing on the natural levees.

By the 1860's the Delta lands were reclaimed and farmed by may groups of immigrants. Many of the earliest landowners were English, German, and Dutch settlers who had not fared well in the gold fields. In 1880 the Oakland firm of Thompson and West published a "mugbook" history of Sacramento County. The book profiled ninety-eight "river pioneers" and their extensive farms and ranches. These "river pioneers" were

from other states and countries including Ohio, New York, Illinois, Sweden, Netherlands, Germany, France, South America, and Portugal.

The early landowners owned anywhere from 36 to 864 acres. The wealthiest man was Josiah Buckman Greene from New Hampshire who owned 114 acres on the Yolo shore opposite the upper end of Randall Island, and a 750-acre ranch across the river in Sacramento County. Originally he bought Merritt Island in 1850 for $600. In 1852, Greene built one of the first island levees on Merritt Island reinforcing the piled-up soil with sycamore logs. Greene also built the first home on Merritt Island.

Dwight Hollister from Ohio was another prominent landowner in the early years of Delta settlement. He was known as the Pioneer Fruit Grower of California due to his early efforts to market pears from the region. John L. Zwart, a Dutchman who settled near Clarksburg, raised potatoes and other vegetables. He was the founding father of truck gardening in the Delta. He made a fortune on melons in 1849; $30,000 from one crop.

Eben Parvin chopped wood and cleared land in order to buy property on Grand Island in 1859. Instead of his employers paying him cash for his labor, he was paid in land mortgages. Unfortunately, the 1862 flood ruined the land's value. Inaccurate surveys forced him to buy parts of his 650-acre spread three times; first from the alleged owner, then from the state, and lastly from the federal government.

As the early Delta landowner began making money, they tore down their old cabins and built riverside cottages or bungalows. The wealthy "pearistocracy", and potato/asparagus barons built great country manors in the ornate carpenter Gothic, or scrollsaw Gothic style. The most notable of the Delta manors was Luis Meyer's River Mansion on Steamboat Slough. (Luis was the son of Henry Meyer the Bartlett Pear King.) The River Mansion was priced at $350,000 in the 1870's.

3. Delta Farmworkers.

Waves of farmworkers helped create the "modern" Delta through construction of hand-built levee and excavation and maintenance of irrigation ditches. Many of the Chinese, Japanese, Portuguese, and other groups of immigrants who first labored on the Delta farms stayed on as tenant farmers or landowners.

The Chinese laborers are credited with building the first levees. Within the first decade after the land was reclaimed, Chinese laborers began tenant farming. From 1860 to 1870 virtually no tenants of other nationalities existed in the Delta. In 1869 Chinese tenants turned the natural levees on the riverside of Roberts Island into long truck and fruit gardens.

Many Japanese farmers who came to the Delta in the 1890's were successful. George Shima, the "Potato King", arrived from Japan in 1889 and eventually became the wealthiest Japanese man in California. Mr. Shima is credited with reclaiming 62,000 acres of Delta land. While many Japanese laborers became tenant farmers and landowners; many lost lands and wealth when the federal government interned Japanese and Japanese-Americans during World War II.

During the asparagus boom in the early 1900's, many Filipinos and Hindus worked along with Chinese and Japanese in the labor intensive asparagus fields.

Delta farmworkers in modern times are largely Hispanic from Mexico and Latin America. The modern labor force is reflected in the high percentage of Hispanic population in Delta communities—about 25%, compared with regional figures of about 21% in Yolo and San Joaquin Counties, but only approximately 12% in Contra Costa, Sacramento, and Solano counties (Ethnic percentages were taken from the 1990 census).

4. Crop History in the Delta.

a. Farming Patterns. Two divergent patterns of land use existed in the early Delta years. Many small and medium-sized farms were located in the northern mainland tracts along both banks of the Sacramento River. Larger farms were located in the center of the islands of the northern Delta in Sacramento and Solano counties and on the mainland tracts and islands of the southern Delta in San Joaquin and Contra Costa counties.

During the 19th Century, most of the smaller farms grew vegetables and fruit in combination with small amounts of grain while the larger farms in the backswamps of the peat islands produced grain, potatoes, and beans. Asparagus was grown on farms of many different sizes. Most landowners did not own more than they could cultivate.

Specialization and diversification have always existed in the Delta. In the 1860's many farmers were diversified, each growing a variety of crops. When Delta farmers began to specialize, they did so in wheat and barley, followed by beans and potatoes. At the turn of the century, specialty crops such as asparagus, beets, tomatoes, celery, and various fruit were grown on a large scale. Today, most Delta farms specialize in only a few crops, which are rotated. The pears have stood the test of time; some orchards are up to 100 years old.

b. Crop Production. Intensive agriculture developed in the Delta as farmers built levees and gained control over groundwater. After the initial reclamation, in the first season the dry tules were burned preparing the land for crop production. Small grains, principally wheat and barley, were grown (Soil Survey of the Sacramento-San Joaquin Delta Area, California, United States Department of Agriculture-University of California Agricultural Experiment Station, 1941). In 1860, wheat was the major export crop of the San Joaquin Valley region. By 1890, Stockton had the greatest milling center in the Pacific states. By 1895, wheat growing declined because of soil depletion, several crop failures, and competition from other wheat areas such as the Northwestern states. Barley was the greatest single export crop of the Central Valley by 1900. In 1923, 725,000 tons of barley was produced in the Valley. The Delta region contributed to both of these large crop productions (Nicholas Hardemann, Harbor of the Heartlands, 1986).

Potatoes and onions were grown in alternate years by many Delta farmers (Soil Survey of the Sacramento-San Joaquin Delta Area, California, United States Department of Agriculture-University of California Agricultural Experiment Station, 1941). Potatoes were more abundant in the Delta region than any other area west of Ohio, occupying up to 25,000 acres of land each season and dominating the potato markets from Louisiana to Alaska. Red onions thrived all year long in the rich peat soil and where also shipped throughout the United States. Delta land yielded more beans per acre than comparable area on the continent. If a few seasons lapsed without a serious break in the levee, it was

not uncommon for potatoes, onions, corn and other intensive field crops to replace the grain (wheat and barley) entirely (Nicholas Hardemann, Harbor of the Heartlands, 1986).

Many of the Delta islands were also used to pasture dairy animals and other livestock, which were moved to higher lands as the water in the rivers began rising.

Delta soil conditions have affected various crops; fruit trees have had to be planted selectively. The Delta's high water table is detrimental to peach, plum, apricot, and cherry trees which grow well on the high natural levees.

The Bartlett pear has been the most important tree fruit produced in the area (Sucheng Chan, This Bitter Sweet Soil, 1986). The Bartlett pear is planted on the higher and better-drained soils along the river and was one of the first deciduous fruits to be grown commercially in the Delta. The Bartlett, or "summer pear" (it is the first to ripen) was originally called the Williams pear and was brought from England in 1770, and renamed in Massachusetts. The pear adapted to the Delta because it not only defied excess moisture better than some other fruit trees, but "delighted " in soils that other deciduous fruits could not withstand. Around World War I, the Bartlett Boom peaked. California produced 48.5% of all American pears; most were grown in Sonoma and Lake Counties, and in the Delta. Pears declined in importance as newly reclaimed lands gave way to asparagus crops (Richard Dillon, Delta Country, 1982).

Asparagus, a principal crop in the 1940's, was not planted extensively before the 1890's. Development of the canning process gave rise to asparagus production in the Delta. A cannery was erected on Bouldin Island in 1892. Later a second plant was erected on the same island, and planting totaled nearly 10,000 acres. In 1904 a disastrous flood covered Bouldin Island to a depth ranging from 10 to 20 feet for nearly a year. In the meantime, the crop harvested from the small plantings of asparagus in other parts of the Delta brought such relatively high yields, that asparagus soon became established on most of the islands. In 1940, asparagus was grown on over 77,000 acres in the Delta.

Sugar beets were first grown in the Delta in the 1920's, on mineral soils on the outer edges of the Delta. They were first planted in the northern section of the Delta, where the soils commonly have a somewhat lower proportion of organic matter (Soil Survey of the Sacramento-San Joaquin Delta Area, California, United States Department of Agriculture-university of California Agricultural Experiment Station, 1941).

5. Unique Delta Inventions.

About half of the Delta is below sea level. The peat soil is so soft and deep that special equipment is necessary. In the earlier years, wagons were equipped with rims ten inches wide and horses were shod with special shoes one foot in diameter.

In 1904, Benjamin Holt invented the Caterpillar tractor which spreads its weight over a wide area. Holt's first successful "Cat" employed tracks forty-two inches wide. It went into production in 1906 and a decade later, 75% of all tractors being used in California were Caterpillars.

Other unique equipment developed in the Delta includes: Peter LeTorneau's mammoth earthmovers, the clamshell dredge, and huge water pumps used to drain islands

inundated when levees are breached (Robert Dawson, The Great Central Valley, California's heartland, 1993).

CHAPTER II: CHANGES IN DELTA LAND USE

(Department of Water Resources, A Report on Land Use Patterns in the Sacramento-San Joaquin Delta, 1993)

The Department of Water Resources prepared an analysis of Delta land use, comparing 1976 and 1993 data titled, "A Report on Land Use Patterns in the Sacramento-San Joaquin Delta, 1993". The study is based on aerial photography.

The biggest change in the **primary zone** was the introduction of 4,500 acres of new orchards and vineyards. The report shows that many acres in the primary zone went between agricultural use and "native" lands, and vice versa. Native lands in the primary zone, which includes 50,000 acres of open water area, totals only 58,100 acres.

The report shows that between 1976 and 1993, there was conversion of about 21,600 acres of agricultural land to urban land uses in the **secondary zone** of the Delta; including the Brentwood and Oakley areas of Contra Costa County, the Pocket area of Sacramento County, the West Sacramento area of Yolo County, and the Stockton and Tracy areas of San Joaquin County. Over one-fourth of the converted lands were orchards; about 5,800 acres.

The following charts show the data developed in the report: Land Use Summary 1976, Land Use Summary 1993, and Summary of Net Changes in Land Use-1976 to 1993.

Table 1. Land Use Summary 1976

		Agriculture				Urban	Native Lands	Waler Surface
		Permanent Crops	Other Crops	Uncropped	Total			
	Primary	0	0	0	0	0	0	0
Alameda	Secondary	0	2.736	22	2.758	103	1.764	51
	Total	0	2,736	22	2.758	103	1,764	51
	Primary	1.647	19.137	461	21.246	929	9.540	15.077
Contra Costa	Secondary	11,337	24.970	1.077	37,384	14.110	13.189	1.513
	Total	12,984	44.107	1.538	58.629	15.039	22.730	16.591
	Primary	7,266	63.711	634	71,611	731	9.832	13.139
Sacramento	Secondary	217	15.776	329	16.322	3.013	2.727	1.218
	Total	7.484	79.487	963	87.933	3 744	12.560	14.357
	Primary	1.818	158.938	862	161,619	1,938	14.350	10.617
San Joaqutn	Secondary	7.874	87.360	1.732	96.966	20.114	9.056	3,244
	Total	9.692	246.298	2.594	258.584	22.052	23.406	13,861
	Primary	754	62.084	375	63.213	154	15,473	7.360
Solano	Secondary	0	0	0	0		5.362	994
	Total	754	62.084	375	63.213	156	20.835	8.354
	Primary	930	58.092	824	59.846	160	11 916	2.665
Yolo	Secondary	188	10,568	100	10.856	3.221	1811	1.299
	Total	1.118	68.660	924	70.702	3.380	13.728	3.964
	Primary	12.416	361,962	3.157	377.534	3.913	61,111	48.859
Legal Delta	Secondary	19.616	141.410	3,259	164.286	40.561	33.910	8.319
	Total	32.032	503.372	6,416	541.820	44,474	95.021	57.178

Table 2. Land Use Summary 1993

		Agriculture				Urban	Native Lands	Water Surface
		Permanent Crops	Other Crops	Uncropped	Total			
Alameda	Primary	0	0	0	0	0	0	0
	Secondary	0	2.055	195	3.050	202	1,300	44
	Total	0	2.055	195	3,050	202	1,300	44
Contra Costa	Pnmaty	710	10.072	4,534	24.115	1.114	6.250	15.313
	Secondary	5.040	19.140	6,493	31.402	22.702	9.730	2.202
	Total	6.550	30.020	11,027	55.597	23.016	15,980	17.595
Sacramento	Primary	9,009	53.540	0,571	71.200	1.144	10.649	12.312
	Secondary	505	10.770	1.611	12.006	5.577	3.290	1.520
	Total	9.594	64.318	10.182	84.094	6.721	13947	13.832
San Joaquin	Primary	3.793	151.460	7.599	162.052	1.941	11.220	12.511
	Secondary	7,424	77,615	6,033	91.073	29 131	5.055	4.121
	Total	11.217	229.075	13.632	253.924	31.072	16,275	16.632
Solano	Primary	1,012	57.167	4,327	62.506	552	15,425	7,710
	Secondary	0	400	973	1.461	46	3.921	929
	Total	1.012	57.655	5.300	63.967	598	19,345	0.647
Yolo	Primary	2.461	41,572	13.000	57,121	267	14037	3.162
	Secondary	69	6.000	2.670	9.555	4.542	1.882	1,200
	Total	2.530	40.300	15.766	66.676	4,009	15.920	4.370
Legal Delta	Primary	17.064	322.619	30.110	377.801	5.019	57,501	51.016
	Secondary	13.030	117.606	17.904	149.507	62 2C0	25.265	10.103
	Total	30902	440.305	56,102	527.309	67219	82.046	61.119

Table 3. Summary of Net Changes in Land Use — 1976 To 1993

		Agriculture				Urban	Native Lands	Water Surface
		Permanent Crops	Other Crops	Uncropped	Total			
	Primary	0	0	0	0	0	0	0
Alameda	Secondary	0	119	173	292	99	(384)	(7)
	Total	0	119	173	292	99	(384)	(7)
	Primary	(938)	(265)	4.073	2.070	185	(3.290)	236
Contra Costa	Secondary	(5.497)	(5.821)	5.416	(5.902)	8.593	(3.459)	768
	Total	(6.435)	(6.087)	9.409	(3.032)	8.778	(6.749)	1,004
	Primary	1.823	(10.163)	7.937	(403)	413	817	(827)
Sacramento	Secondary	207	(5.006)	1.282	(3,436)	2.564	571	301
	Total	2.110	(15.168)	9.219	(3,839)	2.977	1.307	(525)
	Primary	1.975	(7.4781	6.736	1,233	3	(3.130)	1,894
San Joaquin	Secondary	(450)	(9.745)	4,301	(5.893)	9.017	(4,001)	877
	Total	1.525	(17 2221	11.037	(4 660)	9020	(7 131)	2.771
	Primary	258	(4.917)	3.952	(707)	398	(48)	358
Solano	Secondary	0	488	973	1.461	44	(1,441)	(65)
	Total	258	(4.429)	4.925	754	442	(1,489)	293
	Primary	1.531	(16.520)	12.264	(2,725)	107	2.121	497
Yolo	Secondary	(119)	(3.760)	2.578	(1,301)	1.322	71	(91)
	Total	1.412	(20.280)	14.842	(4,026)	1429	2.192	405
	Primary	4,649	(39.343)	34,961	267	1.106	(3.530)	2.157
Legal Delta	Secondary	(5.779)	(23,724)	14.725	(14,778)	21.639	(8,644)	1.784
	Total	(1,130)	(63.067)	49.686	(14,511)	22,745	(12.175)	3.94 1

NOTE: (xxx) INDICATES DECREASE IN ACREAGE

CHAPTER III: CURRENT AGRICULTURE

1. Statewide.

California totals 100 million acres of land of which almost a third, 30 million acres, are in agricultural use (Solano County Agricultural Report, 1992). California leads the nation and the world in the production of food and fiber. California produces 250 different commodities on 83,000 farms (8.5 million irrigated acres). Most grapes, nursery products, cut flowers, processing tomatoes, lettuce, almonds, strawberries, eggs, lemons, broccoli, and carrots are grown in California.

The value of California's farm products in 1990, $18.8 billion, represents 11.1% of the national agricultural output and over 9% of California's economy. California provides about 10% of all exports; exports are nearly 25% of total farm income. California is the exclusive supplier of almonds, dates, figs, raisins, kiwi, olives, cling peaches, prunes, pistachios, walnuts, and garlic for export, and over 80% of all fruits and vegetables for export.

Unfortunately, California also tops the list of states losing farms. In 1992, California lost 4,000 farms or about one-fifth of those lost. Nationwide, the number of farms went down 1%, to 2,068,000. The average farm size in California increased from 468 acres in 1992 to 473 in 1993 (Stockton Record, 8/3/93).

2. Delta Counties.

a. Solano County. Overall, Solano County (Solano County Agricultural Report, 1992) agriculture ranks 28th among food and fiber producing counties in the State. The County produces 65 different commodities and is a leader in production of corn (18%), sheep and lambs (16.3%), wheat (9.5%), Barley (8.1%), processing tomatoes (7.9%), sugar beets ((6.9%) and pears (5%). The County also has significant production of almonds, walnuts, prunes, sunflowers, safflower, dry beans, popcorn and alfalfa hay. The gross production of agriculture countrywide in 1992 was close to $200,000,000. In addition, the County had 15 farms on 500 acres farming by organic method.

About half (45.78%) of the 1992 County agricultural lands are used for pasture. About 40% is used to grow field crops. The remainder includes: fruit and nut crops (3.8%), seed crops (2.6%), vegetable crops (5.7%), and fallow land (2%).

Solano County Department of Agriculture works very closely with the agricultural community to regulate application and use of pesticides including education and training programs. Use of pesticides requires a permit from the County Department of Agriculture. Storage and disposal of containers are also regulated.

There has not been a lot of subdivision of the agricultural lands in the Delta portion of Solano County. There are 895 farms in Solano County (1987), with an average size of 359 acres.

b. Sacramento County. Sacramento County agricultural production rose in 1992, to $229,948,000 (Sacramento County Agricultural Report, 1992). The County is ranked 25th in the State. Milk was the single highest valued commodity, up 6% in 1992, with a total value of $35,550,000. The rest of the top ten commodities were: Bartlett pears ($31,910,000); cattle and calves ($28,500,000); wine grapes ($21,525,000); ornamental nursery stock ($19,293,000); field corn ($12,464,000); processed tomatoes ($8,663,000; turkeys ($7,771,000); wheat ($7,700,000); and rice ($7,101,000). Sale of nursery products has dipped 27% since 1990, due partly to a slump in the construction industry.

A summary of production shows fruit and nut crops (wine grapes, Bartlett pears, walnuts, apples, almonds, cherries, peaches, plums, pistachios, kiwi, and olives) as the leading products at almost $56 million. Field crops (clover, oats, rice, sudan, wheat, alfalfa, beans, sugar beets, and vegetables) are second at $49 million.

In the 87,000 acre Delta portion of the County, the largest acreages are corn (21,670 acres) and wheat (19,402 acres). Other large acreages include: irrigated pasture (approximately 7,000 acres); Bartlett pears (6,099 acres); safflower (4,757 acres); process tomatoes (3,448 acres); wine grapes (3,281 acres); alfalfa hay (3,156 acres); and range lands (approximately 1,800 acres). Other crops grown in the Delta include: sugar beets, barley, asparagus, milo (sorghum), oats, ryegrass, turf, sunflower, fresh tomatoes, sweet corn, bell peppers, kiwis, peaches, and cherries.

The primary responsibilities of the County Agricultrual Commissioner include regulating pesticide use in the County, inspecting goods for pests, and certifying crops which are to be exported. The Office regulates other agencies which use pesticides and herbicides including Vector Control Districts and Department of Boating and Waterways in their battle against water hyacinth. In areas where endangered plants and animals are located, the applicators must use care to avoid spraying the endangered species. The Office participates in seminars and educational programs throughout the County, educating landowners, managers, and workers on safety issues associated with use of pesticides.

Some of the changes in agriculture in the County include the affects of salinity intrusion; for example, Sherman Island has been subjected to salinity intrusion to the extent that crops grown on the island are limited, and the change from labor intensive crops, such as asparagus, to crops which are planted and harvested largely by machines, such as wheat.

c. San Joaquin County. Agriculture is San Joaquin County's number one industry, producing commodities valued at more than $902.5 million in 1992, and employing 12,000 to 20,000 people depending on the season. The County has about 825,000 acres in agriculture use on 4,300 farms. About half of the agricultural land is irrigated cropland. The top ten crops in the County are: milk ($167,900,000); grapes ($97,800,000); cherries ($59,600,000); walnuts ($56,500,00); tomatoes ($56,100,000); almonds ($55,000,000); hay ($48,500,000); asparagus ($40,433,000); cattle and calves ($36,575,000); and chicken eggs ($30,000,000) (San Joaquin County Agricultural Report, 1992). The top ten crops make up 72% of all crops grown in the County.

The Delta has historically produced a large asparagus crop and that continues to this day. Tomatoes, corn and wheat are also important Delta crops. A few potatoes are still grown. Limited acreages of safflower and sunflowers are grown in the Delta.

The Farm Bureau notes the County's farms generally range from mid-sized to smaller-sized, with the larger acreage farms concentrated in the Delta (Stockton Record, 11/9/93. Within the County, 823,729 acres are in agricultural use, with 448,511 acres of irrigated cropland. In 1987, there were 4,366 farms, averaging 189 acres (1992 Agricultural Report).

The 1992 County Agricultural Report shows six registered organic farms in San Joaquin County raising 110 acres of vegetables and 190 acres of fruit and nuts.

d. Yolo County. Yolo County farm revenues for 1992 dropped about 1.5 percent to $233,490,000, and Yolo County is ranked 24th in the State (Yolo County Agricultural Crop Report, 1992). Tomatoes are the dominant crop, but suffered from a large 1993 crop and an oversupply of tomato paste. The tomato crop was valued at $71 million. The next nine crops are: wheat ($17 million); rice ($15.2 million); alfalfa, hay ($14 million); seeds, including sunflower seeds ($12.5 million); English walnuts ($10.5 million); corn ($10.5 million); safflower ($8 million); honeydew melons ($7.5 million); and almonds ($6.7 million).

The County produced a wide variety of agricultural products including $95 million in vegetable crops, $78 million in field crops; $31 million in fruit and nut crops ; $12 million in seeds; $7 million in apiary, livestock, and poultry products; $3 million in nursery products; and $1 million in organic products, for a total value of $233,490,506 for 1992.

Organic production was down, with 123 acres in fruits and nuts and 321 acres in vegetables; and with a total value of $1,153,467.

e. Contra Costa County. Contra Costa County produced $67,008,020 in gross value of agricultural crops and products, a drop of 4% from 1991. The lower gross value was largely due to decreases in the value of nursery crops, livestock and poultry, and vegetables and seed crops. There was a gain in the value of field crops, fruit and nut crops, and livestock products.

Total agricultural acreage in the County is 470,000 acres. The crops which exceeded one million dollars in gross value included: bedding plants ($10.5 million); tomatoes ($7.7 million); apples ($7.2 million); milk ($5.4 million); roses ($4.2 million); asparagus ($3.3 million); sweet corn ($3.2 million); cattle and calves ($3.1 million); rangeland pasture ($2.7 million); field corn ($2.3 million); alfalfa hay ($1.6 million); apricots ($1.5 million); walnuts ($1.4 million); and wheat ($1.2 million).

The County has designated an agricultural core area, of which a very small portion is within the Delta Protection Commission's planning area. Within this area, the County approved an increase in the minimum parcel size to 40 acres. Crops grown in the agricultural core include: sweet corn, apples, peaches, apricots, nectarines, and walnuts. On the Delta islands, common crops include: asparagus, wheat, field corn, safflower, and pasture.

The County Agricultural Commissioner has identified many concerns expressed by residents of the new residential growth areas in the County about spraying of fertilizer, insecticides and pesticides; dust; noise; and lights. Another big issue is agricultural traffic and the conflicts with transporting farm equipment on the public streets, when those streets are filled with local residents and regional commuters, such as on State Highway 4 between Stockton and Antioch. In addition, the Agricultural Commissioner states that most of the

agricultural support industries, such as tractor and equipment sales and service, spraying services, seed, fertilizer, and insecticide dealers, etc, have left Contra Costa County. This makes it more difficult for the farmers to carry out their work. Finally, near the developed areas, the farmers in Contra Costa County complain about vandalism, theft, and trespassing.

CHAPTER IV: LOCAL PLANNING FOR AGRICULTURE

(NOTE: Local land use issues are also discussed in the Background Report on Land Use and Development)

Many agricultural activities are exempt from local regulatory review. In addition, agricultural development on agricultural land does not usually require environmental review. For example, a 5th District Superior Court Judge ruled that Merced County acted correctly when it issued a permit for a 2,050-cow dairy in Merced County on a 66-acre parcel, zoned for agriculture, but did not require an environmental study (Sacramento Bee, 12/10/93).

Federal flood programs are administered by the Counties. Due to widespread impacts associated with flooding on agricultural lands in the mid-west, the Federal Emergency Management Agency, which insures structures in flood plains, may be more flexible in the future. FEMA recently announced that farmers will be able to rebuild non-residential structures in flood plains, rather than raise them above flood level, be surrounded by a dike, or waterproofed. However, FEMA may require higher insurance rates (San Francisco Chronicle, 1/07/94).

1. Solano County.

Solano County's Land Use and Circulation Element (1980) emphasizes the County's goals to preserve the County's high quality soils and protect and maintain essential agricultural lands including areas that possess unique characteristics for raising specialty crops. Approximately 95% of the County was in some form of agricultural use at that time. Southeast of the Dixon area, toward the Delta, sugar beets, grain, and hay have been predominant crops.

About 63% of the County's agricultural, watershed, and marsh lands were under Williamson Act contracts. Urban expansion and development speculation on agricultural lands have placed increasing pressure to convert agricultural lands to urban uses. In addition, urban growth creates conflicts that result in problems with trespass, vandalism, and harassment of livestock and restrictions on activities that generate dust, noise, odor, or pesticide spraying. Other impacts to agriculture include placing agricultural land within city sphere of influence boundaries and subdividing agricultural lands into smaller parcels.

The County General Plan recognizes the need to buffer long-term agricultural areas from adjacent urban uses whenever possible. Much of the County's agricultural land was lost in the 1960's and 1970's to urban development. The County has designated much of the County as agricultural. "Intensive Agriculture" is where high quality soils under irrigation require intensive cultivation techniques. "Extensive Agriculture" is where lower quality soils are used for dry land farming and range land.

The County has defined "farmable unit" as a parcel of sufficient size to be maintained as a farmable unit using modern agricultural practices. It is defined as the size of parcel a farmer would consider leasing or purchasing for differing agricultural purposes. The County has defined farmable unit for non-irrigated land as 160 acres and for irrigated land

as 80 acres. If a landowner can demonstrate that a parcel is highly productive, such as an orchard or vineyard, then a 40-acre parcel may be allowed.

The County has stated it wants to maintain "essential" agricultural lands in productive agricultural activities by retaining parcel sizes in farmable units, protecting lands form urbanization, and preventing the intrusion of conflicting land uses. Essential agricultural lands are those productive farmlands that have been identified by the local community as being necessary to the maintenance of a healthy agricultural economy. Criteria include: soils capability, productivity, parcel size, and the overall size of a farming area. The General Plan supports tax measures that encourage the retention of lands in continued agricultural use. The County wants to continue to expand its agricultural preserve program and to consolidate the existing pattern of agricultural preserves.

In the agricultural areas, the County policies state that housing is necessary to accommodate future residential development accessory to agriculture. The County recognizes the need to provide for farm residences and necessary residences for farm laborers.

In 1984, an ordinance was adopted by Solano County voters to protect the County's agricultural and open space areas from premature conversion to urban and residential uses. The ordinance, which will sunset on December 31, 1995, precludes changes in the agricultural and open space designations in the General Plan, except by a vote of the residents of the county, except in very limited circumstances. The ordinance limits development to one unit per 40 acres on Intensive Agricultural land, and one unit per 80 acres on Extensive Agriculture land, with some exceptions.

2. Sacramento County.

Sacramento County has recently (December, 1993) adopted an Agricultural Element as part of its new General Plan. The Element addresses the conflicts between population growth and urban development near farming areas. Sacramento County has adopted a right-to-farm ordinance and an urban limit line on the General Plan map. The Agricultural Element promotes exempting agricultural landowners from special districts which generate taxes to pay for urban services.

The Conservation Element of the General Plan addresses the special limitations of the peat soils of the Delta, including subsidence from microbial decomposition.

While generally all new construction must be above flood elevations, under the Sacramento County Flood Plain Management Ordinance, the County excludes certain agricultural activities from the need to obtain a Flood Plain Management Permit. These include: normal farming activities, landscape maintenance, parking and storage of vehicles, levee maintenance, and other development which would have an insignificant impact on flood elevations (Final Draft 8/9/93, ordinance adding Title IX to the Sacramento County Zoning Code relating to Floodplain Management). In the Delta, enclosed areas below the lowest floor that are usable solely for parking of vehicles, building access or storage, may be constructed at existing grade provided the building is enclosed with a solid perimeter of concrete block walls with not more than one 3-foot wide door and two 12-foot wide garage doors, and is designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwater, has no windows and the interior walls must

be unfinished. Enclosed barns shall be constructed at or above the base flood elevation; non-enclosed barns may be constructed at grade.

3. San Joaquin County.

San Joaquin County includes rich agricultural areas. The County has large areas of highly productive soils capable of producing a wide variety of crops. Agriculture is a major element of the economic base of the County. Recent increases in demand for residential property, combined with low prices for agricultural products, and rising costs of farming have created pressure for farmers to sell agricultural land to housing developers. To assist in continued agricultural use, the County policies in the General Plan adopted July 1992, promote maintenance of parcels large enough for agricultural operations to be economically feasible and competitive in a commercial market. The General Plan states incompatible uses should be kept out of the agricultural areas as much as possible.

The County has adopted a variety of policies aimed at preserving agriculture. These include: limiting land uses to crop production and agricultural support activities compatible with agricultural operations, including all lands designated for agricultural uses in Williamson Act preserves, supporting mechanisms for the preservation of agricultural lands, such as agricultural trusts, and, County adoption of a right-to-farm ordinance. After completion of a Farmland Mapping Program, the County will consider a minimum parcel size of 80 acres for highly productive agricultural areas; this restriction already applies to much of the Delta. The County also proposes to study appropriate buffers between agricultural operations and non-agricultural uses to prevent land use conflicts. The County General Plan calls for a study of feasibility of establishing a Transfer of Development Rights Program and the feasibility of establishing mitigation fees to be paid when lands are converted from agriculture to other uses.

A 1980 report (San Joaquin County Council of Governments, San Joaquin County Agricultural Land Preservation Study, 1980) identifies fire as a serious hazard to Delta agriculture. Fire hazards include peat soil fires, which consume productive agricultural soils and contribute to soil subsidence; and, gas fires that may be associated with natural gas fields, storage facilities, and pipelines. Fire services in the Delta is very limited.

4. Yolo County.

Yolo County has identified protection of prime and other agricultural land from urban development as key policies. Policy LU 6 urges vigorous conservation and preservation of agricultural land uses, especially in areas presently farmed or having prime agricultural soils and outside of existing planned urban communities and outside of city limits.

Much of Yolo County in the Delta Protection Commission's planning area is within the Yolo Bypass, a designated floodway. The County General Plan will not support residential development, including farm dwellings or other structures housing large numbers of overnight residents in this area.

5. Contra Costa County.

The eastern area of Contra Costa County is predominantly rural and devoted to agriculture, recreation, and open space uses. Much of the Delta area is within the 100-year flood plain.

The Delta area is designated Delta Recreation and Resources (DRR). Many of the islands and adjacent areas are used to grow grains and specialty crops, such as asparagus. The purpose of the DRR designation is to balance the recreational opportunities of the area against the need to allow only low intensity uses that will not subject large numbers of residents or visitors to flood dangers. Agriculture and wildlife habitat are considered the most appropriate uses in the area, with limited recreational uses allowed that do not conflict with the predominantly agricultural and habitat uses. Additional uses allowed in this area by use permit include: marinas, shooting ranges, duck clubs, hunting clubs, campgrounds, and other outdoor recreation complexes.

Maximum permitted residential density is one unit per 20 acres. All recreational uses must be accessible by a publicly-maintained road.

Agricultural land uses countrywide declined by 30% between 1960 and 1988. Between 1960 and 1992, fruit and nut orchards and vineyards dropped from 27,500 acres to 5,300 acres, an 80% decline (Edward P. Meyer, Chief Deputy Agricultural Commission, Letter dated 2/18/94). Nursery plants are now a significant agricultural product. Vegetables, particularly tomatoes, continue to be a significant crop.

County policies allow limited subdivision of agricultural land for “legitimate reasons”, but policies recognize that proliferation of land divisions will have disastrous effects on farmers and ranchers who are trying to remain in business.

CHAPTER V: TRENDS IN AGRICULTURE

1. Productivity and Value.

California agriculture continues to be a leader, both in productivity and value of crops produced. According to a recent editorial prepared by Bruce Obbink, President of the California Table Grape Commission, agriculture generates nearly 10% of California's jobs, while farmers make up less than 1% of the State's population. The value of farm products recently rose to more than $18 billion, a 1% increase, despite water shortages that put roughly half a million acres out of production. California is the nation's largest agricultural producing state.

Problems, which may affect both the productivity and value of agriculture, include new pests such as the medfly and the whitefly, possible water cutbacks to agriculture, and suburban sprawl. A recent American Farmlands Trust study ranked California's Central Valley at the top of a list of 12 regions in the nation most threatened by population growth.

2. Trends in Trade and Exports.

a. *North America Free Trade Agreement (NAFTA).* NAFTA will result in the phasing out of tariffs on all farm products shipped to and from Mexico and Canada (Business Journal, 11/14/93). Some tariffs, such as that on pears, will be phased out over five years, some over a longer period—15 years for products such as corn, dry beans, orange juice concentrate, melons, sugar and asparagus. Mexican import licenses, which cover about 25% of U.S. experts, will be dropped. The Agricultural community has been divided about the value of NAFTA to agriculture; issues include the lower cost of labor in Mexico compared to the U.S. and the less stringent environmental controls which may allow an advantage to Mexican businesses, such as trucking companies.

California sells more agricultural products to Mexico than does any other state. Last year it exported $904 million in agricultural products to Mexico. Three of the top commodities in Sacramento County, milk; Bartlett pears; and cattle, will likely fare well under NAFTA. Other popular items in Mexico include dairy products, beef, citrus, table grapes, nursery products, and tomatoes. In addition to tariffs lifted on products imported into Mexico, NAFTA will stop subsidies on some Canadian products, such as cattle, as high as $90 per head (Business Journal, 12/6/93).

b. General Agreement on Trade and Tariffs (GATT). The United States has recently signed a new international trade agreement, GATT, which will open up worldwide markets for California agricultural products. One example is predicted increased sales for rice in Japan and other Asian nations. Industry experts expect up to 20% more acreage planted in rice this year and a rise in prices by 12% to 25%. In 1993, rice was about $7.50 per hundred pounds, with a federal subsidy of $4 per hundred pounds. In 1995, it is expected that Japan will consume 15% of California's rice production; Japan consumes 10 million tons of rice per year. U.S. growers can produce rice at one-fifth to one-sixth the cost to grow it in Korea, and Korean rice growers are not pleased with future competition. California rice-growing communities will also benefit; one rice farmer said for every $1 of product

harvested, it generates $7 in the local economy (Business Journal, 1/17/94). California's rice growers are the most productive in the world, harvesting more than 8,000 pounds per acre compared with 6,500 pounds per acre in Japan. The average rice farm in Japan is 2.5 acres; in California the average farm is about 225 acres and 1,000 acre farms are common.

3. New Directions in Agriculture.

a. Aquaculture. Aquaculture, defined as an agricultural use, is gaining interest in the region (Sacramento Magazine, June 1991). One farm-raised fish is white sturgeon. U.C. Davis researchers teamed with aquaculturists and developed appropriate techniques for raising sturgeon. Some claim farm-raised fish is a cleaner, safer product than the catch from rivers or the ocean. Cultured sturgeon is fresher and there is better quality control.

Sierra Aqua Farms has a 10 million dollar indoor facility located on a 21-acre site, with 100,000-gallon concrete tanks fed by robots. The tanks cover about 1.5 acres. They usually have about one million pounds of fish on site. The fish are raised from eggs taken from migrating wild sturgeon caught by fishermen, under permits from the Department of Fish and Game.

In a non-commercial vein, the San Joaquin County Vector Control District has just obtained a lease to raise mosquito fish in ponds near the Lodi Wastewater Treatment Facility, near White Slough, in the Secondary Zone. These mosquito fish are placed in water bodies to consume mosquito larvae.

b. Growing Fuels. Agricultural products may provide cleaner fuels for generation of power and for fuel for combustion engines. SMUD (pers. comm. Sue Cartwright, 12/6/93) has studied possible crops which could be grown to provide fuel for a small, 20 megawatt, power plant. SMUD has been a leader in developing small, environmentally sensitive power generation facilities.

Researchers identified four possible crops to grow for fuel; eucalyptus, a perennial tree which takes five years to grow to harvesting size; switchgrass, a perennial which takes three years to grow to harvesting size; sorghum, an annual crop; and corn residue (stalks). Corn, widely grown in the Delta, could be raised for seed crop, and then the stalks sold for fuel. There has been no decision about viability of this concept.

Soybean oil is being used as a clean-burning additive for diesel fuel. A byproduct of extracting materials from soybeans for use in manufacturing soap, toothpaste, foods and packaging, soybean oil will help transportation companies meet strict air quality standards. At this time the fuel is expensive, about $3 per gallon, and hard to obtain. However, in the future, the material, which can be mixed with diesel fuel at a 80%-20% ratio should be more readily available for farm use and for transportation use (Marin Independent Journal, 1/27/94).

3. Loss of Federal Agricultural Support Programs.

The U.S. Department of Agriculture, through the County Agriculture Stabilization and Conservation Service (ASCS) manages federal programs that help provide balanced crop acreage throughout the United States. A recent survey of California farmers named "fickle market prices" as their number one worry (Stockton Record, 12/30/93).

Under the current federal budget problems, the Congress has voted to eliminate many subsidy programs, for example, in 1994, Congress voted to drop a $23 million a year honey subsidy and $190 million a year wool and mohair subsidies.

Continued cutbacks in price supports and other federal programs won't affect most California farmers because they depend less on government help than farmers in other parts of the nation. California farmers count on federal programs for only 11% of their income compared to 35% for farmers nationally. Crops such as cotton and rice are in federal programs, but most of California's 250 crops are grown without direct federal financial help (Stockton Record, 12/15/93).

The ASCS manages the acreage reduction percentages (ARP) program, which sets national limits on certain crops. In 1993, a relatively small field corn crop was grown, so the 1994 feed grain program called for a 5% reduction in corn acres. The controls have been instituted to ensure adequate feed grain supplies during the 94-95 marketing years (River Herald, 11/1/93).

4. Water Diversions.

Current federal actions and future increased demand from urban users will likely result in reduced water for irrigated agriculture. The 1993 California Water Plan Update indicates some Central Valley agricultural lands may eventually be purchased and retired from agricultural use.

Reductions in water available for agriculture in other areas of the Central Valley could have repercussions on Delta agriculture. As crops changed in the past from labor-intensive asparagus to extensive crops, such as wheat and corn, future crops may change.

If crops change toward vegetables and flowers there will be increased need for worker housing, for greenhouses, for packing and storage facilities, etc.

Areas for agricultural support facilities and agriculture-associated industries must be protected to accommodate possible future agricultural uses.

CHAPTER VI: AGRICULTURAL ISSUES

1. Use of Pesticides and Herbicides.

Pesticides and insecticides are key components of modern agriculture, although there are a few "organic" farmers who specialize in agriculture without chemical pesticides or insecticides. Pesticide registration is regulated by the California Environmental Protection Agency (CalEPA). County Agricultural Commissioners are responsible for working with those that apply these materials to farmland. Current State and federal programs support decreasing dependency on chemical pesticides and herbicides, and support the use of smaller amounts of chemicals and the use of biological control agents.

There have been on-going increases in regulation of pesticides and other toxic substances throughout society, which directly affect agriculture. To provide needed control of pests, new "environmentally friendly" biological pesticides are being developed. Many of those are naturally occurring microbes that produce byproducts toxic to certain insects and plant diseases but are nontoxic to non-targeted pests, people and the environment. Currently, biological pesticides account for less than 1% of total pesticides used worldwide, but the potential market--$22 billion worth a year—is enormous. The U.S market is about $5 to $6 billion per year. Many large chemical companies are interested in the new biological pesticides and are forming partnerships to develop and market the products now being created by small research and development companies (Business Journal, 8/16/93).

ASCS is also promoting the Integrated Crop Management (ICM) program. This program seeks to reduce the use of pesticides, nutrients, or both through improved management techniques. Producers of specialty crops such as, orchard crops, processing and fresh market tomatoes, will be eligible for $20 per acre and non-specialty crops such as wheat, alfalfa, and other row crops will be eligible for $7 per acre, up to $3,500 per crop year, for a three year commitment. The target is to reduce pesticides and nutrients by 20% by substituting more environmentally acceptable pesticides with lower toxicity (River Herald, 11/17/93).

One of the key issues associated with pesticides is the safety of the agricultural workers in applying chemicals or in working in areas where chemicals have recently been applied. Training in the safe and appropriate use of pesticides is available through the University of California Cooperative Extension or the County Agricultural Commissioners offices. These classes train individuals on the appropriate safety equipment that must be used (goggles, gloves, boots, respirators, etc.); the appropriate conditions for making applications (temperature, wind); safety intervals for re-entering areas where an application has been made; and other issues relevant to the legal use of products. Many of the classes help to prepare participants for taking the California Department of Pesticide Regulation Qualified Applicator Certificate examinations.

Another issue associated with pesticides is possible impacts off site. A landowner is responsible for application on his/her lands. Nationwide, about 25% of all agricultural chemicals are applied by air, and more than 50% of all commercial applications of crop protection are aerial (California Farmer, January 1993). Aerial applications are vulnerable to drift if not used under proper conditions.

2. Agricultural Labor Force.

One of the key changes in Delta agriculture has been the shift from labor-intensive agriculture to largely mechanized agriculture. Planting, irrigation, and cultivation are now largely handled by sophisticated machinery. Hand work in the Delta is associated with tree pruning, harvesting of some crops, and hoeing.

While many farmers hire full time, permanent agricultural workers, much of the agricultural work (pruning, planting, and harvesting) is seasonal. Most of the seasonal work force, 95%, is from Mexico; mostly men who come to work in California without their families. Most work for labor contractors, not the farmers themselves. This labor pattern started in the early history of Delta agriculture when Chinese labor contractors provided work crews of Chinese laborers.

A big problem is affordable housing for the seasonal and permanent workers, who receive low incomes (Stockton Record, 9/28/93). Farm wages dropped 50% faster in the 1980's than manufacturing wages, from $7 per hour to minimum wage. Average annual farm-worker earnings today are about $6,500 (Stockton Record, 9/28/93). In 1968, there were 5,000 farm labor camps statewide under State permit. In 1991 there were 532.

Impacts associated with the change in land use from agriculture to developement (urban) in portions of the outer Delta are reflected in the loss of agricultural jobs. In Contra Costa County, it is estimated that farm jobs have dropped by 50% since 1977 (SF Chronicle, 11/30/93).

3. Consolidation of Services and Transfer of Costs.

As is found in other segments of California business, agriculture is suffering from reduced funds for promotion and advertising and increased pressure to transfer costs historically funded by the taxpayers to industry.

Agriculture has traditionally been served by the Department of Food and Agriculture-run commodity boards who serve growers of one crop. In a recent change, eight commodity boards representing growers of apricots, avocados, cherries, citrus, kiwis, strawberries, grapes, and pears will work together to anticipate and manage issues that address all eight products (River Herald, 1/4/94).

And, the proposal would create an education-promotion marketing order covering all of California's 83,000 farmers and all of its commodities. Promotions would be funded by a one-half percent levy on all farm receipts, raising an estimated $6 million per year. Hearings were held in fall of 1993 and a decision on this matter is anticipated in Spring of 1994 (River Herald, 10/6/93).

The County Agricultural Commissioner system, unique to California, has proven effective in enforcing uniform commodity standardization and inspection programs, carrying out important pest detection, control and eradication activities, and protection of consumers. In recent years, much activity has been in pesticide use enforcement. Based on 1992 figures, total costs for all Agricultural Commissioner activities relating to pesticide use

enforcement, pest detection control and eradication, and various commodity inspection programs, amounted to $69.6 million. Much of these costs is reimbursed by the State and through fees paid by industry, with the net cost to counties being $23.5 million. Cash-strapped counties are considering transferring additional costs to industry. Donald Gordon, President of the Agricultural Council of California, has indicated the need to reassess the entire Agricultural Commissioner system; its service to the industry, its public health and safety responsibilities, and its consumer protection activities (River Herald, 9/29/93).

CHAPTER VII: MEANS OF PROTECTING AGRICULTURAL LANDS

Local governments in the Delta and in other areas of the State and nation have developed a wide range of planning "tools" to help protect and promote agriculture. Many of those "tools" are described below. A combination of several land use elements appears to be the best approach to protecting agricultural land use. The combination may be different in different communities; but should include policies which clearly define agriculture, speak to the community's commitment to protect agriculture, maintain the largest possible parcels, ensure that subdivisions will not adversely impact agriculture, protect agriculture from nuisance suits from non-agricultural land uses, and keep taxes on agricultural lands as low as possible.

1. Agricultural Element in the General Plan.

A General Plan must include several elements and may include any others the local government wants to include. An agricultural element is not required. Development and adoption of an agricultural element in a general plan helps to provide clear policies which reflect a community's desire to protect, maintain, and enhance agriculture.

Sacramento County recently adopted an agricultural element (December 1993) which outlines the County's policies. The element was prepared with the assistance of the Agricultural Element Advisory Committee, which included local landowners and farmers.

2. Urban Limit Line.

A General Plan Map may include an urban limit line, which is intended to delineate the boundary between areas which may eventually be developed for residential and other urban uses, and those areas which will remain in low density, rural, agricultural, and open space uses. The urban limit line is intended to clarify future land uses for landowners and developers. Some believe adoption of an urban limit line puts increased pressure on agricultural uses existing within that line to sell out.

Both Sacramento and Contra Costa Counties have adopted urban limit lines on their General Plan maps.

3. Agricultural Buffers.

Buffers are areas used to separate new urban/suburban uses from agricultural and open space uses and protect rural areas from urban conflicts. Devices to be used include setback lines, fences, planted areas, and physical barriers. New development can be clustered in areas furthest from agricultural lands, leaving a maximum of open space as a buffer. Buffers can be required by local government as part of a subdivision.

Buffers would seem to be most useful when "urban" uses are planned near permanent agriculture areas. The secondary zone of the delta will eventually be developed with a variety of uses. By planning to create a buffer, or transition area, between agricultural land uses and residential uses conflicts over noise, dust, early morning and late night activities, and spraying, can be minimized. The buffer area could be warehouse-type development,

utilities and infrastructure improvements, parks and recreation areas, or managed habitat areas.

Agricultural landowners need assurance that buffer areas don't create their own conflicts, such as endangered species habitat, or unkempt, weedy vegetation that could adversely impact agricultural lands.

The Coastal Commission requires a 200-foot wide setback as a buffer zone in developments adjacent to commercial agricultural lands.

4. Right to Farm Ordinance.

Most counties with large amounts of agricultural lands have "right to farm" or agricultural use notice. The ordinance forewarns new residents that agricultural exists in the region and may generate dust, noise, odors, sounds, chemicals, and other byproducts of normal agricultural activities. Many ordinances require that such a notice be recorded when new lots are created in agricultural areas.

Right to farm ordinances have been adopted by San Joaquin, Sacramento, Yolo, and Solano Counties. Contra Costa County has prepared an ordinance, which has been under review by County Counsel for two years.

5. Large Minimum Parcel Size.

Many Counties that seek to protect agricultural lands form incursion from rural residential development have raised the minimum parcel size to a parcel size that is too large, or too expensive to serve as a residential parcel. In the 1970's, Marin County approved 60-acre minimum parcel size in a move to protect agricultural parcels from pressures to subdivide and sell. Under review of the Countywide Plan, the County planning staff is concerned that in that real estate market, 60-acre minimum parcels are vulnerable to rural residential development pressure (pers. Comm, Carol Williams, Marin County Planning Department, 8/31/93).

Sacramento County authorized a study in August 1975 to look at parcel sizes to support viable agriculture. The Commission found that "efficient" farm sizes were 2,000 acres for row crops, 800 acres for dairy, and 200 acres for walnut orchard. Based on "income" ($10,000 per year in 1976), the minimum size unit would be 800 to 2,000 for dry pasture, 133 to 250 acres for irrigation pasture, 105 to 200 acres for field crops, and 87 to 200 for row crop. Based on "existing farm sizes" in the entire County, the mean size was 715 acres for field and vegetable crops, 3,683 acres for dry pasture, 138 acres for orchard, and 171 acres for irrigated pasture. Last, the study determined the size of a parcel to remain in commercial agricultural real estate market as opposed to the hobby agriculture or rural agriculture real estate market, "farmable units". The recommendation of the study was that irrigated lands be a minimum parcel of 80 acres, and dry land a minimum parcel of 160 acres.

Solano County has based minimum parcel size on the size a farmer would buy or lease as part of a farming operation, a "farmable unit". The County has set minimum parcel sizes at 80 acres for irrigated lands, or 40 acres for highly productive parcels with orchards or vineyards, and 160 acres for non-irrigated lands.

6. Amended Zoning Ordinance to Ensure Protection of Agricultural Land Use.

Counties may adopt zoning codes which protect agricultural land uses through requirement of an approved master plan for agricultural uses, requirement of a use permit for conditional uses, development of stringent standards and requirements, and requirement of specific findings prior to approval of development permits.

For example, the Marin County coastal agricultural zone allows only the following permitted uses subject to an approved master plan: agricultural uses; one single family dwelling per parcel (defined as all contiguous assessor's parcels under common ownership unless legally divided); accessory structures appurtenant and necessary to the operation of agricultural uses including barns, fences, stables, corrals, coops and pens, and utility facilities, and bed and breakfast operations with up to three guest rooms.

Conditional uses, which require a use permit, include: farm worker housing, mobile homes used exclusively for employees of the owner who are actively and directly engaged in the agricultural use of the land; hog ranch; veterinary facilities; fish hatcheries and rearing ponds; stabling of more than five horses and ranches where horses are the primary or only animals raised; planting, raising or harvesting of trees for timber, fuel or Christmas trees; facilities for processing or retail sale of agricultural products; greenhouses; commercial storage and sale of garden supply products; greenhouse; water conservation dams and ponds; mineral resource production; game or nature preserve or refuge; public or private recreational activities such as hunting, fishing, and camping; bed and breakfast operation which provided four or five guest rooms; construction or alteration of gas, electric, water, communication, or flood control facilities related to an agricultural use, or dump.

The following findings must be made prior to issuing a use permit or subdivision:

a. The development will protect and enhance continued agricultural use and contribute to agricultural viability.

b. The development is necessary because agricultural use of the property is no longer feasible. [The purpose of this standard is to permit agricultural landowners who face economic hardship to demonstrate how development on a portion of their land would ease this hardship and enhance agricultural operations on the remainder of the property.]

c. The land division or development will not conflict with the continuation or initiation of agriculture on adjacent parcels, or those within one mile of the perimeter of the proposed development.

d. Adequate water supply, sewage disposal, road access and capacity and other public services are available to service the proposed development after provision has been made for existing and continued agricultural operation.

e. Appropriate public agencies are able to provide necessary services (fire protection, police protection, schools, etc.) to serve the proposed development.

7. Modifying Zoning Ordinance to Limit or Condition Land Uses in Agricultural Zones.

Agricultural zoning usually allows for a wide variety of infrastructures, community service, and open space-type uses. The Delta lands face special issues due to the low elevation of much of the area. In addition, some open space and recreation uses, which may be appropriate in agricultural zones in other areas, would not take advantage of the unique characteristics of the Delta.

To eliminate conflicts in the agricultural areas, Yolo County has eliminated golf courses in agricultural zones where they would be located on Class I or Class II soils. The Yolo County planning staff has suggested requirement of a use permit in order to ensure that wetland enhancement and other habitat projects are appropriately designed and sited so as to preclude conflicts with common agricultural practices. Concerns were raised when a migration site was planted with elderberry bushes directly adjacent to actively farmed lands. The bushes, planted to provide habitat for the endangered elderberry beetle, could be adversely impacted by herbicides or pesticides used in normal agricultural practices.

To address the first concern, the agricultural zoning code would be scrutinized to ensure that allowed uses are agricultural. Other uses,which take advantage of the unique characteristics of the Delta should be allowed with a use permit, which would allow appropriate conditions to be built into a new use. Last, sues which are not agricultural and which do not take advantage of the unique characteristics of the Delta should not be allowed.

8. Adopt Strict Criteria to Evaluate Proposals to Change General Plan Designation.

Tulare County has adopted (adopted in 1975 and amended in 1987) a Rural Valley Lands Plan to establish minimum parcel size for areas zoned for agriculture and to develop a policy that is fair, logical, legally supportable, and which utilizes resource information to determine the suitability of rural lands for nonagricultural uses. The plan sets out a range of parcel sizes from 80 acres down to 5 acres.

The plan defines 15 factors to evaluate a parcel's suitability for nonagricultural zoning. If the parcel is in an agricultural preserve or an individual waste disposal facility cannot be permitted, the parcel must stay in agricultural use. Other factors include: land capability (class of soil); existing parcel size, existing land use; suitability for cultivation; surrounding land use; proximity to inharmonious uses; level of groundwater and soil permeability; proximity to land within agricultural preserve; proximity to fire protection facilities, access to paved county or state maintained road; historical, archaeological, wildlife habitat and unique natural features; flood prone areas; and availability of community domestic water. These criteria are given different values (points) and "surveyed". If the points total 17 or more, the parcel stays in agriculture. If the points are between 12 and 16, the parcel must be evaluated based on the unique circumstance pertaining to that particular parcel; and if the points are 11 or less, the parcel may be considered for nonagricultural use.

Another similar process is the Land Evaluation and Site Assessment (LESA) system developed by the Soil Conservation Service. This is also a process to evaluate proposals to convert agricultural land to nonagricultural uses. This system uses a list of criteria to evaluate a site, with a system of weighing those criteria. These criteria are in two programs: Land Evaluation and Site Assessment. Land Evaluation (100 points) uses land capability classification; identification as important farmland; and soil productivity. Site Assessment

(200 points) includes: agricultural land use within 1.5 miles, adjacent and on site; zoning: percentage of land zoned agriculture within 1.5 miles, compatibility/impact of uses: distance from village, environmental impact, compatibility with surrounding area, impact on historic, cultural features; urban and rural infrastructure; transportation available, availability of central sewer, agricultural support system; land use feasibility: soils suitability for on site disposal; size of site; and consistency with county or municipal plan.

In at least two California Bay Area counties, the voters have voted to take decisions about changes in General Plan designations for agricultural lands out of the hands of the Board of Supervisors. In both Napa County and Solano County, the voters decided that only the voters should have the ability to change designations for agricultural lands. The Solano County ordinance, adopted for a ten-year period, sunsets in 1995. A new version of the ordinance will likely be before the voters in 1994.

9. Easements.

Easements are used by several land trusts, nationally and locally, as a tool to protect agricultural land. An easement is acquired when a landowner gives up, by gift or through sale, one or more of the "rights" associated with a property. For example, a 400-acre farm in a zone which would allow parcel sizes down to 40 acres, could potentially be divided into 10 parcels, each could be sold and developed with a residence. The potential value of ten parcels can be determined thus indicating potential value associated with the farm. The landowner may choose to sell or donate that potential value, and keep the farm permanently at 400 acres and permanently in agricultural use. There are a couple of different methods for obtaining easements.

Monies can be given to the landowner, in exchange for restrictions on development of the land for residential or commercial uses. Continued agricultural uses of the property can thus be assured. In Marin County, conservation easements are funded by Open Space bond monies, by State bond monies (Prop70), and by fund raising by a non-profit group, Marin Agricultural Land Trust (MALT). To date, MALT holds conservation easements on 25,140 acres of agricultural lands. The cost of the development easements is averaging $1,000 per acre.

In areas with no funds to acquire easements, such as Napa County, conservation easements are donated and the value of the easement can be treated as a donation on the landowners' taxes. Conservation easements are also sought as part of estates, as a gift in a will.

Easements may be partially purchased and partially donated; one Marin County landowner received a cash payment for a portion of the value of the easement, and donating to MALT the difference between the appraised value of the easement and cash payment. Easements can also be required as part of a development process; Marin County obtained easements to 2,500 acres of land from George Lucas as a condition of his county permit to develop Skywalker Ranch as a film making facility.

Conservation easements can also be obtained as mitigation for environmental impacts identified through the environmental review process. For example, where lands slated for development will change land use from agriculture to suburban, commercial, or office, there will be an associated loss of wildlife habitat. In San Joaquin County, the loss of habitat for the Swainson's Hawk has become an important issue. One way to mitigate loss of habitat,

is to obtain permanent easements on farmland to ensure that the needed type of habitat (open fields) will be maintained near nesting sites.

10. Transfer of Development Rights.

Transfer of development rights (TDR) is used by some local governments to reach the goal of maximizing undeveloped lands, while allowing some development for the landowner. TDR is also used to relocate potential development from areas where environmental or land use impacts could be severe to other areas where those impacts can be minimized while still granting appropriate development rights to each property.

Marin County's coastal agricultural zone allows a landowner to transfer the number of units permitted on one property (the donor property) to be transferred and built on another (receiving property), either contiguous or noncontiguous. Marin County requires a Master Plan to be approved for TDR and the TDR must be to an area where TDR is allowed through a community plan or countywide plan. Calculation of the number of units to be transferred is determined by dividing the area of the parcel to be conserved by the number of acres per dwelling unit allowed by the zoning minus the existing number of dwellings. The receiving property must have the support services and infrastructure necessary for the development. A conservation easement or restriction must be recorded against the donor property; which restricts future development or division.

Difficulties associated with TDR programs include finding appropriate areas to serve as receiving properties if located in a different community. In one example in New Jersey, the arrangement set values for the development rights and allowed the rights to be sold. However, while areas were designated as receiving properties, they did not have adequate infrastructure (sewer service) to allow development at the higher level. The area had little demand for new development so there was little demand to purchase the development rights.

11. Williamson Act (Department of Conservation, The Williamson Act: Protecting Our Land Resources, 1992).

The Williamson Act, the California Land Conservation Act, was approved by the Legislature in 1965 to address pressures on agricultural landowners from skyrocketing property values in the 1950's and 1960's. During those years, about one million acres of agricultural land was lost to development.

The Williamson Act is a voluntary land conservation program that is administered by counties and cities with guidance and technical assistance from the Department of conservation. The purpose of the Act is: to preserve farmland for a secure food supply, to maintain agriculture's contribution to local and state economic health, to provide economic relief to tax-burdened farmers and ranchers, to promote orderly city growth, and to preserve open space for its scenic, social, aesthetic, and wildlife values.

The Act is carried out through contracts between the landowner and the local government; which restricts the contracted land for use in agriculture or open space for at least ten years, and the landowner receives in turn pays lower taxes based on the actual use of the land for agricultural purposes. The contract is automatically renewed each year unless the landowner notifies the local government of non-renewal; the contract then ends in ten years.

Counties and cities lose property tax revenue when land is enrolled in a Williamson Act contract. To partially compensate for this loss, the State pays each county and city a "subvention" payment based on the amount of acreage and the type of land enrolled in contracts. The amount of the subventions was modified in 1993 and is now: $5 per acre for prime land and $1 per acre for non-prime land.

Forty-eight of the 52 counties participate in the program providing protection to 15 million acres of agricultural land, an open space. About half of California's prime farmland is protected by the Act's contracts. The Williamson Act is estimated to save agricultural landowners from 20% to 75% in property tax liability each year. In 1989, the total tax savings was approximately $120 million. A recent study shows that 30% of landowners currently under the Act would not be farming or ranching if it were not for the Act's tax protection. The Act has helped to limit leapfrog development and the loss of agricultural land around existing built-up areas.

Countries can adopt their own criteria for administering the Williamson Act, as long as key criteria set out in the Act are met.

Yolo County (Department of Conservation, 1990-91 Williamson Act Status Report, 1992) created a "Blue Ribbon" Task Force in 1989 to evaluate the Act. The county has a very high percentage of participation, nearly 90% of the county's total farmland. Until recently, the County did not allow any cancellations (a small cancellation was allowed for a fruit drying operation needed by local farmers). The Task Force was directed to make recommendations, primarily on the problems of maintenance of parcel sizes suitable for commercial agricultural production and the prevention of fragmentation of farmland by parcel splits as a precursor to urbanization in agricultural areas. The task force made the following recommendation:

a. Program Entry. To participate in the County program, landowners must meet the following criteria:

1) Only lands whose primary use is clearly for commercial agriculture, outdoor recreation, such as hiking, hunting, or of "public value" as open space or wildlife habitat be allowed under contract.

2) Stringent minimum parcel sizes; 75 acres for cultivated/irrigated land; 150 acres for cultivated/non-irrigated lands; and 500 acres for range land or non-income producing native land. Sub-minimum parcels must be legally merged before entering a contract; non-contiguous parcels meet the minimum size in aggregate, be free of living units, comply with zoning, and be stipulated non-buildable parcel for the life of the contract. Allow for exception for minimum parcel size, if submit annual declaration of use for commercial agriculture (20 acres for irrigated and 40 acres for non-irrigated). If a legal parcel within a single contract is sold, the single residential unit limitation continues to apply to the entire contract, regardless of the number of separate ownerships.

b. Conditional uses in Agricultural Preserve Zones. Adding agriculture-related commercial or industrial facilities in AP zones, subject to public hearings and conditional use permits, if the project supports agriculture production, if the use is not appropriate in developed area, and if there are no suitable alternative sites outside the AP zone. Commercial recreational uses not benefit the Williamson Act.

c. Splits of Williamson Act Contracts. All splits of existing contracted parcels meet the recommended standards for new contracts and subject to findings: (1) new parcels will not encourage the encroachment of non-agricultural uses; (2) new parcels will serve to maintain the agricultural economy; (3) new parcels will support the preservation of prime lands, and /or (4) new parcels will act to preserve lands with public open space value.

d. Cancellation of Contracts. In the 1981 Sierra v. Hayward, California Supreme Court decision, Williamson Act contract cancellation was unequivocally identified as a method of contract termination to be used in extraordinary circumstances only. Cancellations only be considered when the stringently interpreted findings required by state law can be made and only following at least two public hearings before the planning commission and two public hearings before the Board of Supervisors.

e. Related Policy Recommendations:

1) Adopt a Right-to-Farm Ordinance.

2) Adopt a Direct Marketing Ordinance to allow and regulate farmer to consumer sales.

3) Adopt Agricultural Enterprise Zoning to attract supporting ag-related industry.

4) Improve mitigation of farmland depletion as part of the CEQA process (e.g., impact fees, conservation easements, etc.)

5) Adopt a General Plan Agricultural Element to unify policies that protect and promote agricultural land uses, including policies that strategically target minimum parcel-size zoning and that direct development away from prime soils.

6) Improve regional planning through better coordination with other local governments.

7) Develop public/private funding for land conservation.

CHAPTER VIII:

MANAGEMENT OF AGRICULTURAL LANDS FOR WILDLIFE HABITAT

There are several programs that emphasize management of agricultural lands to maximize wildlife habitat values. These include conversion of portions of the agricultural lands to permanent habitat, either wetland or upland; seasonal flooding of agricultural lands; and special habitat programs such as wood duct habitat improvement.

1. Creation of Wetlands.

There are existing federal programs which seek to convert agricultural lands to permanent wetlands. These programs are appropriate for low-lying areas which cannot be economically farmed and for areas on the periphery of the Delta that have been used for unirrigated grazing lands that can be enhanced as wetlands. The North American Waterfowl Management Plan, a program of the U.S. Department of Fish and Wildlife Service, recognizes that much of the agricultural lands was once wetlands. The program has many approaches to protecting and restoring wetlands. Habitat can be purchased, leased, or protected with easements. Landowners are offered economic incentives for farming practices that benefit waterfowl, from planting dense cover for nesting birds to re-flooding rice fields after harvest for wintering waterfowl.

The California Central Valley (Central Valley Habitat Joint Venture) has lost 95% of the original wetlands, converted to agriculture under government programs that encouraged reclamation for agriculture. Sixty percent of the ducks, geese, swans, and millions of shorebirds of the Pacific flyway crowd into 280,000 acres of wetlands. Plans call for the creation of 120,000 acres of new wetlands on marginal farmland, and nearly 750,000 acres of wetland enhancement on public and private lands. The program has utilized incentive programs for private landowners (USFW, Joint Use in a Partnership for Wetlands, no date).

The Wetlands Reserve Program is a voluntary program offering landowners a chance to receive payments for restoring and protecting wetlands on their property. Authorized by the Food, Agriculture, and Trade Act of 1990, the programs provide a unique opportunity for farmers to retire marginal cropland and reap the benefits of having wetlands on their property. The program obtains easements from participating landowners and provides cost share payments for wetlands restoration. The Department of Agriculture plans to restore and protect one million acres from the year 1991 to 2005. The program pays farmers for safeguarding certain defined lands and for restoring and protecting wetlands. This program does require long term commitments; either 30-year easements for permanent easements, that will be purchased. The total easement may not exceed the average fair market value of the same type of agricultural land in the area. The bid may include additional costs to cover costs of restoration and long-term maintenance of the wetlands. Payments may be either lump sum or spread over 10 years. The easement does not require the lands to be open to the public for hunting, fishing or other forms of recreation (Wetlands Reserve Program: Restoring America's Wetlands Heritage, April 1992).

The program has only been funded in one year, 1992, and the program was over subscribed. Applications were handled on a "bid" basis, with landowners submitting proposals to compete for the limited funds available. California landowners submitted bids for 34,296 acres; 6,026 acres were accepted with a per-farm average of 287 acres. The federal government pays for the easement and 75% of the restoration costs; the landowner pays 25% of the restoration costs and long-term maintenance and repair. Of the California lands, 5,634 were previously converted croplands, farmed wetlands, and riparian areas; 5,679 acres will be restored to emergent wetlands (marshes). The average cost of the easements in California was $1,626 per acre, significantly higher than the $742 per acre average payment (American Farmland Trust, Workbook for wetlands Reserve Assessment Project, February 1993).

The program will be active in 1994, under similar program guidelines—permanent easements to be acquired through payment of full value of land, 75% federal cost share for wetland restoration; 25% match by landowner and landowner accepts long-term maintenance costs. Funding level will be $67 million to enroll up to 75,000 acres nationwide (River Herald, 1/19/94).

2. Seasonal Flooding of Agricultural Lands.

Delta agricultural lands have been flooded in the winter months for close to 60 years for multiple purposes: leaching of salts from soils, weed control, to attract waterfowl for hunting, and to provide wildlife habitat. The 1980 Madrone Report on Delta Wildlife Habitat identified the Contra Costa and San Joaquin County Islands of Staten, southern New Hope, Brack, northern Terminous, Webb, Venice, Empire, King, Mandeville, Medford, Quimby, Mildred, McDonald and Rindge as important areas for migratory and wintering waterfowl.

There have been attempts in recent years for formalize this ongoing practice and to ensure that a substantial number of flooded acres is available every winter. Voluntary agreements to support seasonal flooding to provide wildlife habitat on agricultural lands were signed in 1990 by several Delta landowners and managers and by Audubon Society, California Waterfowl Association, U.S. Fish and Wildlife Service, Ducks Unlimited, The Nature Conservancy, Soil Conservation Service, San Francisco Estuary Project, and the Department of Fish and Game.

The Delta CARE (Conservation of Agriculture, Resources and the Environment) is a special program within the Central Valley Habitat Joint Venture, currently funded through special funds generated by Ducks Unlimited (DU). DU has hired a staff person dedicated to working full-time in the Delta with the private landowners on development of management plans to provide, flooded winter habitat. In year one of the five-year program, DU is pleased that 20,000 acres of land are flooded, with a goal of 30,000 acres flooded by 1998. The management practices in the plans will help farmers provide winter water and food for water birds, while slowing or preventing erosion and land subsidence, preventing weed growth, reducing soil salinity, and maintaining the farmer's right to use the water. The plans will provide guidance for timing, depth, and duration of flooding management techniques through formal planning with the landowners. It will also assist with any necessary redesign of water delivery structures or other engineering service. DU also documents use of these lands by conducting bird counts by land and by air (River News Herald, 11/10/93).

DU will conduct demonstrations and workshops to provide assistance. Programs will include field days, publications, tours and other efforts. In addition, DU proposes to work with the traditional information services that work with the agricultural community including the Cooperative Extension Service, Soil Conservation Service, Resource Conservation Districts, Vector Control Districts, and others.

3. Agricultural Land for Mitigation of Development Impacts.

Mitigation banks is a concept which is now starting to be implemented in California. Under the environmental review process, proposed development projects are evaluated in light of their unavoidable adverse impacts on the environment. A permitting agency can require mitigation to offset adverse impacts of a project.

While mitigation banks were first endorsed in the 1970's, a variety of conflicting views of the value of the mitigation bank sites, and conflicting approaches regarding the implementation of the mitigation banks prevented implementation of the concept. In the last couple of years, the first mitigation banks have been approved. Currently, the Department of Fish and Game has Memorandums of Understanding with two landowners to provide lands for mitigation banking.

One proposal, on 1200-acre Medford Island, is agricultural land of which a portion would remain in agriculture. Other areas of the island would be managed as seasonal wetland, ponds, and riparian woodland. A second proposal for a mitigation bank would enhance lands along the Sacramento Deep Water Ship Channel for wildlife habitat. One reason why mitigation banking on agricultural lands is a currently viable proposal is the loss of foraging lands for Swainson's Hawk, a State-listed species.

Concerns have been raised in projects where cash payments only are received for mitigation. For example, a $46,299 payment to Department of Fish and Game for impacts associated with a Stockton truck factory, without a location or deadline for providing appropriate mitigation (SF Chronicle, 9/19/93). By working to develop mitigation banks, developers can "purchase" units in a mitigation bank.

Another example of mitigation is the "habitat unit compensation plan". In this program, land in the planning area is evaluated based on habitat value and designated red zone (worth 3 units per acre), green zone (worth 2 units per acres), and white zone (worth 1 unit per acres); developed areas with no habitat value are designated gray zone. Land voluntarily set aside receive credits. A compensation ratio determines how many units of credit must be offered for each unit of habitat lost, to a maximum ratio of three to one. For example, loss of an acre in the red zone would be mitigate with 9 habitat units per acres of impact; this could be done with either 3 acres in the red zone or 4.5 acres in the green zone. While this approach does not place an absolute cap on development in any one zone, it effectively caps the total loss of habitat value would be protected from development. This plan, based on habitat value rather than habitat acreage, will provide strong incentives to compensate in large, connected areas of habitat, as well as strong disincentives to disturb these areas.

ADOPTED FINDINGS

Findings:

1. The State California has about 30 million acres of agricultural land out of a total of 100 million acres in the United States. Of the 30 million acres of agricultural lands, about 8 million are irrigated. California leads the nation in the production of food and fiber. California agricultural products are diverse, with over 250 crops and livestock commodities, and with no one crop dominating. The value of farm products statewide in 1992 was $18.1 billion, over 9% of the State's economy. Each California farmer produces enough food and fiber for 129 people, including 97 people in the U.S. and 32 abroad.

2. The State of California tops the list of states losing farms. In 1992, California lost 4,000 farms. However, the average farm size increased slightly from 468 acres for 473 acres (about 1%).

3. The total agricultural income for the five Delta Counties is $1.6 billion dollars (1993). The Delta portions of the five counties are some of the most valuable agricultural land in each County due to the rich peat and mineral soils and the riparian water supply.

4. The Delta counties designate the Delta lands primarily for agricultural use; Contra Costa County has a special "Delta Recreation and Resource" designation for the Delta islands.

5. New trade and export opportunities will probably increase markets for California's agricultural products. Currently State exports are at $4.7 billion.

6. Consumer trends, new crops, and new uses for crops will continue to change the face of agriculture. Examples are growing crops for fuel for power plants and cars; reuse and recycling of portions of crops such as cotton seed and soybean oil for fuel and corn stalks as a fuel source.

7. Current trends, regulations, and programs are resulting in reduced use of chemical fertilizers, pesticides, and herbicides. There is an increasing use of biochemical agents and integrated crop management. Farmers need to maintain or increase crop production levels.

8. As in other parts of government, program costs such as information gathering and dissemination are being shifted from government to agriculture. Costs of regulation are also being shifted to users, reflected in larger permit fees, etc.

9. Local government has used various means to protect agricultural land uses: adopting right to farm ordinances, adopting rules prohibiting subdivision of lands under Williamson Act agricultural land uses, increasing minimum parcel sized, adopting an agricultural element to the General plan, adopting criteria to evaluate proposals to take land out of agricultural use, purchasing conservation easements(development rights) to compensate landowner for loss of development

potential, and allowing transfer of development rights from agricultural parcels to other parcels.

10. Conflicts between agricultural activities and new residential, commercial, industrial, and recreational uses create long-term conflicts which have a deleterious impact on agriculture. Complaints by non-farmers include: noise, dust, odors, flies, mosquitoes, aerial applications of fertilizer, pesticide and herbicide, night activity, and other aspects of normal agricultural activity. Complaints by farmers include trash, vandalism, increased traffic, loss of agricultural land, and dust

.

11. Programs at State and federal level support land management to enhance habitat values on private agricultural lands. Some programs will result in permanent conversion of agricultural land. Examples include: creation of wetlands on agricultural lands; seasonal flooding of agricultural lands; deferred tillage; deferred harvesting of grains; enhancement of field edges as habitat; and planting native plants along roadways and between fields. However, many of the existing programs do not reflect the unique Delta resources and opportunities.

12. Agriculture in the Delta evolves as farming practices, market opportunities, and government programs change. Availability of water makes the Delta a unique geographical region for agriculture. Future agricultural practices may require construction of additional infrastructure to accommodate more intensive agricultural operations.

Policies:

1. Commercial agriculture in the Delta shall be supported and encouraged as a key element in the State's economy and in providing the food supply needed to sustain the increasing population of the State, the Nation, and the world.

2. Local governments shall identify the unique qualities of the Delta which make it well suited for agriculture. These qualities include: rich soil, ample supplies for water, long growing season, mild climate, and proximity to packaging and shipping infrastructure. The unique physical characteristics of the Delta also require that agricultural land owners maintain extensive levee systems, provide flood control, and have adequate drainage to allow the lands to be farmed.

3. Education of the local populations about the value and rich heritage of agriculture in the State and in the Delta shall be continued and expanded.

4. Local governments shall support long-term viability of commercial agriculture in the Delta because of its ecomonic and environmental importance to the State and local communities.

5. Support shall be given to current and alternative programs that help to minimize the need for costly production inputs such as fertilizers, pesticides, and herbicides as long as crop production levels and agricultural income can be maintained. Improving crop production and agricultural income is vital to the success of Delta agriculture.

6. Each local government shall continue to implement the necessary plans and ordinances to: maximize agricultural parcel size; reduce subdivision of agricultural lands; protect ordinary agricultural activities; protect agricultural land from conversion to other uses; and clearly define areas in that juridiction where urban land uses are appropriate and where agricultural land uses are appropriate.

   An optimum package of regulatory and incentive programs would include: (1)an urban limit line; (2) minimum parcel size consistent with local agricultural practices and needs; (3) strict subdivision regulations regarding subdivision of agricultural lands to ensure that subdivided lands will continue in agriculture; (4) delete from zoning ordinances "other" land uses which are not compatible with agriculture; (5) particularly residential development outside but adjacent to the Primary zone; (6) an agriculture element of the General plan; (7) a right-to-farm ordinance; and (8) a conservation easement program.

7. Encourage acquisition of agricultural conservation easements as mitigation for projects within each county, or through public or private funds obtained to protect agricultural and open space values, and habitat value that is associated with agricultural operations. Encourage transfer of development rights within land holdings from parcel to parcel within the Delta, and where appropriate, to sites outside the Delta. Promote use of environmental mitigation in agricultural areas

only when developed in appropriate locations designated on a county-wide or Delta-wide habitat management plan.

8. Encourage management of agricultural lands which maximize wildlife habitat seasonally and year-round, through techniques such as sequential flooding in fall and winter, leaving crop residue, creation of mosaic of small grains and flooded areas, controlling predators, controlling poaching, controlling public access, and others.

9. Local government may continue to retain agricultural zoning and minimum parcel sizes as described in zoning codes in palce January 1, 1992. Where minimum parcel size is less than 40 acres, local governments shall describe how smaller parcel sized will support long-term viability of commercial agriculture in the Primary Zone. This policy shall not be construed to require the re-zoning of subminimum parcels.

10. Local government may develop programs to cluster agriculture-dependent residential units or transfer development rights (TDRs) to off-site locations. Clustering on a single farm would be for family members or employees and would not exceed maximum number of units allowed under existing zoning as of January 1, 1992. Clustering would be accompanied by conditions to preserve agricultural use and open space values on the balance of the property. TDRs may involve transfers from farms to Primary Zone communities with adequate flood protection to protect residential use, or to sites out of the Primary Zone.

11. Local governments that pursue clustering or transfer of development rights shall proceed with adoption of procedures to implement such programs as part of the Delta plans.

12. Where portions of Cities are located within the Primary Zone, Cities shall indicate zoning which was in place on January 1, 1992. Future changes to City General Plans or zoning ordinances shall conform to the adopted Land Use and Resource Management Plan.

ADOPTED RECOMMENDATIONS

Recommendations:

1. Programs to educate California and the U.S. about the value and diversity of California agriculture should continue. Education should provide information about various crops and about the different agricultural regions, such as the Delta.

2. As new information on best management practices to control subsidence of peat soils becomes available, the Commission should review that information and , if appropriate, amend the Plan.

3. The five Delta county farm bureaus should coordinate on issues of joint concern.

APPENDIX A:

List of Non-Profit Groups Working on Agricultural Issues

North Delta Conservancy
P.O. Box 534
Courtland, CA 95615

Area of Interest: North Delta, Sacramento County

Mission: Promote and protect environmental, economic, and cultural heritage of the North Delta. Promotes agricultural practices that provide wildlife habitat, such as flooding, and protect Delta resources, sponsor training and education for landowners and farmers, promotes education for children about agriculture and wildlife.

Active in hosting workshops and distributing information to members. Distributes newsletter.

Ducks Unlimited
9823 Old Winery Place, #16
Sacramento, CA 95827

Area of Interest: Nationwide; Delta CARE in California's Delta

Mission: Work with private landowners to promote wildlife habitat on agricultural lands, focusing on fall/winter flooding; will prepare management plan for landowner. Currently 20,000 acres flooded; goal to have minimum of 30,000 acres flooded each winter.

Full-time staff person working in the Delta with private landowners. Active in setting up workshops and distributing information to interested parties.

Delta Habitat Conservancy (Wildlife Mitigation Bank Project)
C/o 146 West Weber Avenue
Stockton, CA 95202

Area of Interest: San Joaquin County

Mission: Obtain conservation easements on 50,000 continuous acres of farmlands in the Lower Delta to preserve the basic agricultural nature of the area, which provides habitat for migratory waterfowl and related bird and animal populations.

New organization

Greenbelt Alliance
116 New Montgomery Street
San Francisco, CA 94105

Area of Interest: Nine Bay Area Counties/Solano and Contra Costa

Mission: Regionwide citizen land conservation organization founded in 1958 dedicated to protection of the region's greenbelt and to enhancing the livability of cities. Long term proposed is to ensure that the nine county Bay Area remains a sustainable community for all who live there. Produces studies, reports, and analyses for the public. Active in trying to protect agricultural lands in Contra Costa County and Solano County. Supports public access, open space lands for regional hiking and biking trails. Opposed toll road in Solano and Contra Costa Counties. Distributes newsletter.

Yolo Environmental Resource Center
132 E. Street, Suite 2F
Davis, CA 95616

Area of Interest: Yolo County

Mission: Educate and inform public on current environmental issues; consortium of 25 environmental groups, originally focused on UC Davis campus. Holds quarterly meetings, distributes newsletter, hosts trips and educational programs.

Solano County Farmlands and Open Space Foundation
P.O. Box 115
Fairfield, CA 94533

Area of Interest: Solano County

Mission: Coalition of farmers and conservationists formed to preserve important agricultural and open space between urban communities. Works with landowners to permanently protect lands through acceptance of donations, acquisition of conservation easements and purchase of land. No activities on agricultural lands in Delta area; currently focusing on I-80 corridor.

American Farmlands Trust
1949 Fifth Street, Suite 101
Davis, CA 95616

Area of Interest: Nationwide; western regional office in Davis, Yolo County

Mission: Lobby and educational group to protect agricultural lands nationwide from urban encroachment. Works at national and State level, as well as grassroots protection work. Distributes newsletter, magazine, books, and maps. Hosts informational workshops and classes.

San Joaquin Open Space and Farmland Trust
P.O. Box 4126
Stockton, CA 95204-0126

Area of Interest: San Joaquin County

Mission: Works with the agricultural community to seek permanent preservation of the important farmlands through acceptance of donations, purchase of conservation easements, and by acquisition of land; protection of open space, and preservation of open space and grazing lands between the growing communities.

APPENDIX B:

Programs For Agriculture

1. Cooperative Extension.

The University of California Cooperative Extension is a nationwide programestablished by Congress in 1914 as part of the Land Grant University system and is located in every state. Three levels of government participate in funding Cooperative Extension programs: Federal, through USDA, provides a portion of the budget; State, through the universities, pays salaries of academic employees and the statewide management; and Counties provide office space, equipment, and support staff.

The mission of the program is to develop, extend, and bring about the use of research-based knowledge to improve specific practices and technologies. Cooperative Extension makes practical information generally available. Cooperative Extension has research support in agriculture and natural resources, in family and consumer sciences, in community resources development, and in youth development.

The Extension sponsors programs including: research, general education, training, food and nutrition education, mater gardening, and 4-H for young people in urban and rural areas.

2. Integrated Pest Management (IPM).

University of California manages a $2.5 million research and educational program related to Integrated Pest Management (IPM). The Program started in 1979, has the following goals:

- To reduce the pesticide load in the environment
- To increase the predictability and thereby the effectiveness of pest control techniques
- To develop pest control programs that are economically, environmentally and socially acceptable
- To marshal agencies and disciplines into integrated pest management programs
- To increase utilization of natural pest controls

The program includes:

- Provide advice to Cooperative Extension advisors, growers, and pest control professionals
- Developing and maintaining computerized database, used primarily by U.C. scientists
- Produce publications, videos, and training programs related to pest management and pesticide safety

- Fund research projects in five areas: applied field ecology, biological controls, biorational use of biotic agents or chemicals, cultural controls, and decision support.

3. Department of Food and Agriculture

The mission of the Department of Food and Agriculture (DFA) is to promote California agriculture, protect it from pests and diseases, build consumer confidence in the marketplace, provide solid policy on critical issues facing the industry, and ensure the safety and wholesomeness of food and other agricultural products for the consumer.

The DFA includes: Division of animal Industry which prevents, detects, diagnoses and control animal diseases and pests; the Division of Fairs and Expositions; the Division of Inspection Services; Division of Marketing Service, which assures the orderly marketing, reduction of economic waste, adequate supply, consumer protection, and fair pricing practices; Division of Measurement Standards; Division ;of Plant Industry, which prevents the introduction and establishment of pest and diseases of plants and seeds; Division of Administrative Services; and other special offices.

DFA works closely with the agricultural community particularly through provision of marketing services (see Chapter VII; consolidation of services and transfer of costs). Additionally, DFA works to protect public health and safety through inspections and certifications.

4. California Environmental Protection Agency.

California Environmental Protection Agency (CalEPA) has responsibility for supervision of the State's pesticide and herbicide regulations. CalEPA works closely with County Agricultural Commissions on licensing, inspection and supervision responsibilities. Cal EPA sets standards and guidelines for use of these materials.